

(propellant injection phase), and possibly in a third stage a propellant-free further melt portion is charged into the cavity, the production of the injection molded articles occurring in the cavity,

wherein metering of the physical propellant in the second stage occurs in a pressure regulated manner, wherein the pressure which is exerted on the propellant during the propellant injection phase is greater than the pressure which is exerted on the propellant in the phases between or before or after metered addition, and the expansion of the propellant occurs in the cavity.

2. (Amended Once) The process of Claim 1, wherein the propellant is a compressible fluid.
3. (Amended Once) The process of Claim 1 further comprising the step of maintaining the propellant under pressure in the intermediate cycle times before and after the propellant injection phase.
4. (Amended Once) The process of Claim 3, further comprising maintaining the propellant at a pressure of at least  $p_{crit}$  at a given temperature during the intermediate cycle times.
5. (Amended Once) The process of Claim 1, further comprising the step of controlling the pressure exerted on the propellant via a pressure control valve.
6. (Amended Once) The process of Claim 5, wherein the pressure control valve is a multi-way valve.
7. (Amended Once) The process of Claim 6, wherein the multi-way valve is a 3/3-way proportional valve or a 2/3-way proportional valve.

8. (Amended Once) The process of claim 1 further comprising the step of controlling the pressure of the critical propellants via at least one pressure relief valve connected downstream of the pressure control valve.

9. (Amended Once) The process of Claim 8, wherein at least one of the pressure relief valves has a holding pressure equal to or higher than the pressure at which a critical propellant is held in the intermediate cycle times.

10. (Amended Once) The process according to Claim 1 further comprising the step of regulating the pressure preset by the pressure control valve via one or more pressure relief valves to the injection pressure at which the propellant is added to the melt via an injection point.

11. (Amended Once) The process of claim 1, wherein the injection point is configured as a throttle means.

12. (Amended Once) The process of Claim 11, wherein the injection point is in the form of a defined gap in an injector or of an injector with a sinter metal.

13. (Amended Once) The process of Claim 11, wherein the injection point is configured as a controlled closure mechanism.

14. (Amended Once) The process of Claim 1 further comprising the step of using water as the propellant.

15. (Amended Once) The process of Claim 1 further comprising the step of using a gas or gas mixture as the propellant.

16. (Amended Once) The process of Claim 15, further comprising the step of using carbon dioxide as the propellant.

17. (Amended Once) The process of Claim 16, wherein the carbon dioxide is held in the intermediate cycle times at a pressure of at least 60 bar.

18. (Amended Once) The process of Claim 1 further comprising the step of elevating the pressure of the propellant during the propellant injection phase to a pressure of over 60 bar using the pressure control valve.

19. (Amended Once) The process of Claim 1 further comprising the step of generating a counterpressure in the cavity.

20. (Amended Once) The process of Claim 1, wherein the physically foamed injection molded article is selected from the group consisting of a handle, a knob, a gearshift knob, a steering wheel casing, a ball, a sphere, a fender, a float and a closing means for bottle-like containers.

21. (Amended Once) A device for the metered addition of physical propellants to a foamable melt, comprising:

- a storage means, in which the propellant is stored under pressure,
  - a pressure control valve for regulating the propellant pressure, and
  - an injection point, which is configured as a throttle means, at which the propellant under pressure is fed to the melt,
- wherein a controlled closure mechanism is provided at the injection point.

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A 22. (Amended Once) The device of Claim 21, further comprising at least one pressure relief valve.

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[Please add the following claims:]

--23. (New) The process of claim 1, further comprising the step of:  
maintaining the propellant in a compressed state in the intermediate cycle times before and after the propellant injection phase.

A<sup>2</sup> 24. (New) A device for the metered addition of physical propellants to a foamable melt, comprising:

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a storage means, in which the propellant is stored under pressure,  
a pressure control valve for regulating the propellant pressure, and  
an injection point, which is configured as a throttle means, at which the propellant under pressure is fed to the melt,  
wherein at least one pressure relief valve is provided at the injection point.--

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